# Cloud Computing

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# Caveats and Disclaimers

- This presentation provides education on cloud technology and its benefits to set up a discussion of cloud security

- It is NOT intended to provide official NIST guidance and NIST does not make policy

- Any mention of a vendor or product is NOT an endorsement or recommendation

Citation Note: All sources for the material in this presentation are included within the Powerpoint "notes" field on each slide

# Cloud in 2020

- THE FUTURE OF CLOUD COMPUTING
[SOURCE: Pew Research Center's Internet & American Life Project,
AUTHOR: Janna Anderson, Lee Rainie]
Nearly 900 Internet experts and highly engaged users said they expect
people who use the Internet will "live mostly in the cloud" by 2020, working
primarily through the use of cyberspace-based applications on remote
servers that we access through our networked devices. This does not
mean, however, that most think the desktop will disappear soon. The
majority sees a hybrid model continuing where both cloud computing and
desktop computing take on different functions. The Web-based survey,
conducted by the Pew Research Center's Internet & American Life Project
and the Imagining the Internet Center at Elon University, gathered opinions
on 10 important issues from a select group of experts and the highly
engaged Internet public. Results from this survey are being released in five
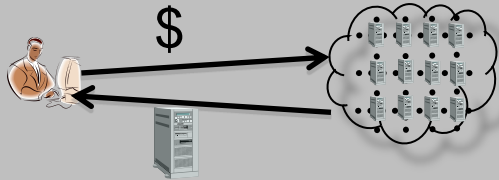major 2010 reports; this is the fourth.
benton.org/node/36787 | Pew Research Center's Internet & American Life
Project
Recommend this Headline

# What is Cloud Computing?
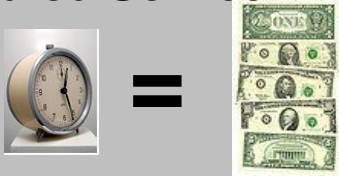
## 5 Key Characteristics

**1** On-demand self service

$

renting takes minutes

**2** Broad network access

anywhere / any device

**3** Measured Service

$$\text{(clock)} = \text{(money)}$$

conserve resources

**4** Rapid Elasticity

$$\$\left( \begin{array}{c} \times \text{ Jan Feb Mar …… } \quad\quad Dec \end{array} \right)$$
$$=$$
$$\$\left( \begin{array}{c} \times \underline{\text{Jan}} \end{array} \right)$$

rent it in any quantity

**5** Resource pooling

off    off    **on**
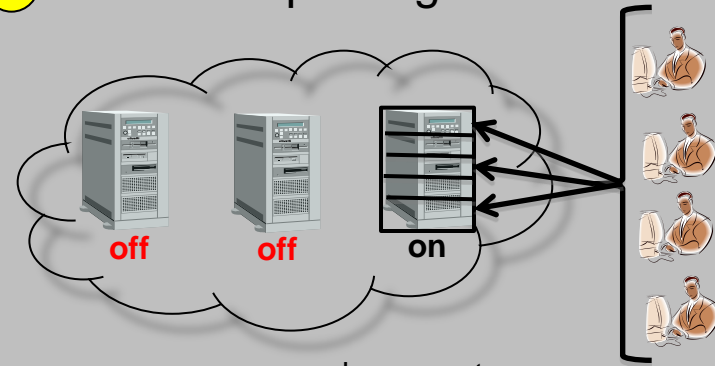
reduces cost

# The NIST Cloud Definition Framework

Hybrid Clouds

**Deployment Models**

**Private Cloud**

**Community Cloud**

**Public Cloud**

**Service Models**

| Software as a Service (SaaS) | Platform as a Service (PaaS) | Infrastructure as a Service (IaaS) |
|---|---|---|

**Essential Characteristics**

On Demand Self-Service

| Broad Network Access | Rapid Elasticity |
|---|---|
| Resource Pooling | Measured Service |

**Common Characteristics**

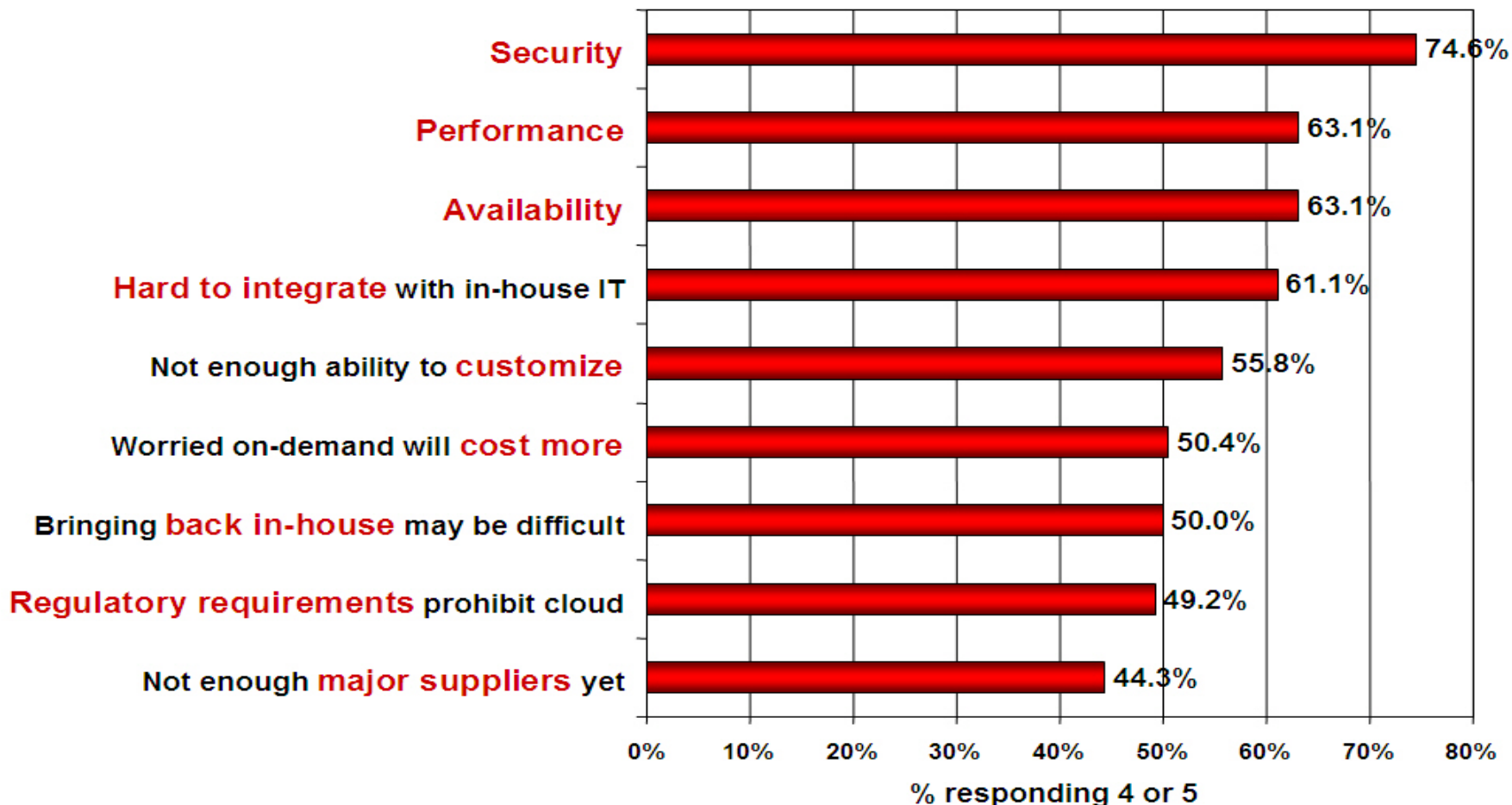| Massive Scale | Resilient Computing |
|---|---|
| Homogeneity | Geographic Distribution |
| Virtualization | Service Orientation |
| Low Cost Software | Advanced Security |

# What is the Big Opportunity?

- Focus on your core mission
- Cost reduction
- Scalability
- Agility → facilitate quick innovation

# Assurance is a Major Issue

**Q: Rate the challenges/issues ascribed to the 'cloud'/on-demand model**
(1=not significant, 5=very significant)



Security — 74.6%
Performance — 63.1%
Availability — 63.1%
Hard to integrate with in-house IT — 61.1%
Not enough ability to customize — 55.8%
Worried on-demand will cost more — 50.4%
Bringing back in-house may be difficult — 50.0%
Regulatory requirements prohibit cloud — 49.2%
Not enough major suppliers yet — 44.3%

% responding 4 or 5

Source: IDC Enterprise Panel, August 2008  n=244

ST
National Institute of
Standards and Technology

# What are the issues?

- Security & Privacy
- Network Access
- Portability/Interoperability
- Long term costs
- Compliance
- Service Level Agreements
- Legal
- Standards

# Crowd Sourcing and Clouds

# What is Crowd Sourcing?

The general idea is that there are so many people that can contribute to content, whether Wikipedia or Open Source Software, that you can create consensus/wisdom/insight via mass.

– Source: http://alainmowad.com/innovation/crowd-sourcing-as-the-ultimate-cloud-computing-paradigm/

# Comparisons

- We begin this discussion from three quasi-related ideas:

    – Open Source Access

    – Social Networking

    – Conventional Wisdom

# Open Source

- <u>Wikipedia Definition</u>: **Open source** describes practices in production and development that promote access to the end product's source materials. Some consider open source a <u>philosophy</u>, others consider it a <u>pragmatic methodology</u>. Before the term *open source* became widely adopted, developers and producers used a variety of phrases to describe the concept; *open source* gained hold with the rise of the <u>Internet</u>, and the attendant need for massive retooling of the computing <u>source code</u>. Opening the source code enabled a self-enhancing diversity of production models, communication paths, and interactive communities.

# Social Network Service

- Wikipedia Definition: A **social network service** focuses on building and reflecting of social networks or social relations among people, e.g., who share interests and/or activities. A social network service essentially consists of a representation of each user (often a profile), his/her social links, and a variety of additional services. Most social network services are web based and provide means for users to interact over the internet, such as e-mail and instant messaging. Although online community services are sometimes considered as a social network service in a broader sense, social network service usually means an individual-centered service whereas online community services are group-centered. Social networking sites allow users to share ideas, activities, events, and interests within their individual networks.

# Conventional Wisdom

- <u>Wikipedia Definition</u>: **Conventional wisdom** (CW) is a term used to describe ideas or explanations that are generally accepted as true by the public or by experts in a field. The term implies that the ideas or explanations, though widely held, are unexamined and, hence, may be reevaluated upon further examination or as events unfold.

# What Should Enterprises Do?

- Develop the business case first
- Consider the architectural goals
- Orderly migration where appropriate
  - with fallback options, if it doesn't work out
- Negotiate SLA carefully
- Understand but not be paralyzed by legal, security, and the technology issues

# More Advice

- Start with a pilot

- Sunk Costs

- Not an either/or decision

- Cast a wide net

- Understand organizational issues


- Source: http://www.utest.com/webinars/better-apps-crowdsourcing-cloud

# Apps/Ideas/Uses

- Collaboration
- Software Testing
- Citizen Engagement
- Scientific Applications
  - Genomic research
  - Bioinformatics
  - Commercialization

# Examples

- Amazon Mechanical Turk

- U-Test

- Facebook translation

- Samasource

# Wild Ideas

- Federal Crowd Sourcing Service
- Internal Crowd Sourcing

# References to Crowd Sourcing

- Crowd Sourcing as the Ultimate Cloud Computing Paradigm (On March 31, 2010, In Innovation, By amowad)
  http://alainmowad.com/innovation/crowd-sourcing-as-the-ultimate-cloud-computing-paradigm/

  Outsourcing is Passe. Is Crowd Sourcing in?  Project management has entered version 3 advancing upon the 'outsourcing' concept a little further and working across boundaries-- the new concept is 'crowd sourcing'
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  Crowd Sourcing – Harnessing the power of the people
  Posted by Bhavin Turakhia
  http://bhavin.directi.com/crowd-sourcing-harnessing-the-power-of-the-people/

  Better Apps With Crowdsourcing & The Cloud
  A Joint Webinar with uTest and Skytap
  http://www.utest.com/webinars/better-apps-crowdsourcing-cloud

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  HCL Infosystems goes the cloud way with O'zone - Introduces cloud services such as HRM and Healthcare Information Management solutions based on the SaaS model (InformationWeek News Network, July 09, 2010)
  http://www.informationweek.in/Cloud_Computing/10-07-09/HCL_Infosystems_goes_the_cloud_way_with_O%e2%80%99zone.aspx

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  http://fcw.com/articles/2010/05/28/gsa-testing-crowdsourcing-wiki-for-acquisitions.aspx

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  http://www.eschoolnews.com/2010/05/10/feds-turn-to-crowdsourcing-for-educational-innovation/

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  http://govfresh.com/2009/11/6-government-sites-crowdsourcing-citizen-ideas/